

## Supplementary Materials

### Metagenomic Analysis of Viruses from the Bat Fecal Samples Reveals Many Novel Viruses in Insectivorous Bats in China

Xingyi Ge<sup>1</sup>, Yan Li<sup>1</sup>, Xinglou Yang<sup>1</sup>, Huajun Zhang<sup>1</sup>, Peng Zhou<sup>1</sup>, Yunzhi Zhang<sup>2</sup>, Zhengli  
Shi<sup>1\*</sup>

***Author affiliations:*** State Key Laboratory of Virology, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China<sup>1</sup>; Yunnan Institute of Endemic Diseases Control and Prevention, Dali, China<sup>2</sup>.

Table S1 Reads related to eukaryotic viruses as determined with Blastn and the GenBank database.

<b>Virus Name</b>	<b>Reads Count</b>	<b>Virus family</b>
<b>Invertebrate viruses</b>		
Aedes aegypti densovirus	1532	
Aedes albopictus densovirus	246	<i>Parvoviridae; Densovirinae; Brevidensovirus</i>
Aedes albopictus C6/36 cell densovirus	188	
Aedes aegypti Thai densovirus	1156	<i>Parvoviridae; Densovirinae; unclassified Brevidensovirus</i>
Blattella germanica densovirus	1434	
Junonia coenia densovirus	725	
Mythimna loreyi densovirus	679	<i>Parvoviridae; Densovirinae; Densovirus</i>
Diatraea saccharalis densovirus	643	
Galleria mellonella densovirus	304	
Bombyx mori densovirus 5	218	
Bombyx mori densovirus	217	<i>Parvoviridae; Densovirinae; Iteravirus</i>
Bombyx mori densovirus 1	193	
Haemagogus equinus densovirus	73	
Casphalia extranea densovirus	19	<i>Parvoviridae; Densovirinae; unclassified Iteravirus</i>
Dendrolimus punctatus densovirus	3	
Periplaneta fuliginosa densovirus	2	<i>Parvoviridae; Densovirinae; Pefudensovirus</i>
Toxorhynchites splendens parvovirus	22	<i>Parvoviridae; Densovirinae; unclassified Densovirus</i>
Canine parvovirus	159	
Feline panleukopenia virus	65	<i>Parvoviridae; Parvovirinae; Parvovirus</i>
Raccoon parvovirus	1	
Goose parvovirus	5	<i>Parvoviridae; Parvovirinae; Dependovirus</i>
Choristoneura occidentalis granulovirus	2	<i>Baculoviridae; unclassified Betabaculovirus</i>
Rachiplusia ou MNPV	2	
Plutella xylostella multiple nucleopolyhedrovirus	1	<i>Baculoviridae; Alphabaculovirus</i>
Himetobi P virus	216	
Aphid lethal paralysis virus	132	<i>Picornavirales; Dicistroviridae; Cripavirus</i>
Rhopalosiphum padi virus	62	
Israel acute paralysis virus of bees	39	<i>Picornavirales; unclassified Dicistroviridae</i>
Kashmir bee virus	17	

Acute bee paralysis virus 3

### Vertebrate viruses

#### Bat Coronaviruses

Bat coronavirus HKU9-1 188

Bat coronavirus HKU9-2 119

Bat coronavirus HKU9-4 81

Bat coronavirus HKU9-3 14

Bat coronavirus HKU6 10

Bat coronavirus A701/2005 9

Bat coronavirus 512/2005 7

Bat coronavirus Fujian/773/2005 1

Bat coronavirus A515/2005 1

Bat coronavirus HKU8 1

*Nidovirales; Coronaviridae; Coronavirus;  
Coronavirus group 2d*

*Nidovirales; Coronaviridae; Coronavirus;  
Coronavirus group 1; Coronavirus group 1b*

#### Adenoviruses and

##### Adeno-associated viruses

Bovine adenovirus 1 1

Simian adenovirus 3 1

Porcine adenovirus 5 1

Adeno-associated virus 53

Rat adeno-associated virus 1 43

Non-human primate  
Adeno-associated virus 38

Mouse adeno-associated virus 1 18

Adeno-associated virus - 4 17

Avian adeno-associated virus  
ATCC VR-865 16

Adeno-associated virus - 7 13

Adeno-associated virus VR-355 6

Adeno-associated virus VR-195 6

Adeno-associated virus - 8 6

Adeno-associated virus - 6 6

Adeno-associated virus - 1 4

Adeno-associated virus 10 3

Adeno-associated virus - 3 2

Avian adeno-associated virus  
strain DA-1 2

Adeno-associated virus 3B 2

Bovine adeno-associated virus 2

Adeno-associated virus - 5 1

Adeno-associated virus 11 1

*Adenoviridae; Mastadenovirus*

*Parvoviridae; Parvovirinae; Dependovirus*

#### Retro-transcribing viruses

HERV-H/env60 1

Amphotropic murine leukemia  
virus 1

Moloney murine sarcoma virus 1

Xenotropic MuLV-related virus  
VP62 1

Moloney murine leukemia virus 5

Friend murine leukemia virus 1

*Retroviridae; unclassified Retroviridae;  
Human endogenous retrovirus*

*Retroviridae; Orthoretrovirinae;  
Gammaretrovirus*

Caprine arthritis-encephalitis virus	4	<i>Retroviridae; Orthoretrovirinae; Lentivirus</i>
Avian sarcoma virus	2	<i>Retroviridae; Orthoretrovirinae Alpharetrovirus</i>
Bovine viral diarrhea virus 1	1	<i>Flaviviridae; Pestivirus</i>
Mink astrovirus	1	<i>Astroviridae; Mamastrovirus</i>
Equine rotavirus	1	<i>Reoviridae; Rotavirus; unclassified rotavirus</i>
Stealth virus 1	1	<i>Herpesviridae; Betaherpesvirinae; Cytomegalovirus</i>

### Plant virus

Tomato mosaic virus	1	
Ribgrass mosaic virus	1	
Cucumber green mottle mosaic virus	73	
Tobacco mosaic virus	33	<i>Tobamovirus; unclassified Tobamovirus</i>
Tobacco mild green mosaic virus	4	
Crucifer tobamovirus	1	
Hibiscus chlorotic ringspot virus	1	<i>Tombusviridae; Carmovirus</i>
Tomato yellow ring virus	1	<i>Bunyaviridae; unclassified Tospovirus</i>
Bamboo mosaic virus satellite RNA	16	<i>Satellites; Satellite Nucleic Acids; Large single-stranded RNA satellites</i>

### Other virus

Acanthamoeba polyphaga mimivirus	7	<i>Mimiviridae; Mimivirus</i>
Emiliana huxleyi virus 86	1	<i>Phycodnaviridae; Coccolithovirus</i>

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Table S2A Contigs related to eukaryotic viruses as classified with Blastn and the GenBank database.

Contig No.	Length (nt)	Best match (virus)		Region	Coverage on the genome	Identity	E-value
		Abbreviation, GenBank No. and References					
<i>Contigs related to Dengovirus, Dengovirinae, Parvoviridae</i>							
SC5411	149	BgDENV, AY189948 (20)		VP1	1067-1214	90%	7.29E-50
SC7800	122	DsDENV, AF036333		NS1	1993-2098	83%	7.77E-23
SC14615	108	DsDENV, AF036333		NS1	1321-1427	86%	8.61E-28
SC4308	106	JcDENV, S47266 (11)		NS1	1170-1275	90%	1.09E-32
SC18090	122	BgDENV, AY189948 (20)		NS1	3027-3145	82%	1.85E-24
SC2121	653	DsDENV, AF036333		NS1	2121-2775	70%	4.17E-74
SC2228	1236	GmDENV, L32896 (28)		VP1	3671-4230	71%	5.12E-70
SC2796	129	GmDENV, L32896 (28)		VP1	5081-5208	87%	2.27E-36
SC6109	105	GmDENV, L32896 (28)		NS1	1808-1912	88%	1.94E-29
<i>Contigs related to Brevidengovirus, Dengovirinae, Parvoviridae</i>							
SC17716	124	HeDENV, AY605055 (24)		NS1	2048-2167	83%	2.99E-28
SC2302	320	C6/36 DENV, AY310877		NS1	1130-1265	76%	1.93E-17
<i>Contigs related to unclassified Dengovirinae</i>							
SC569	1927	CpDENV, FJ810126 (4)		NS1	846-2769	95%	0
SC3632	121	CpDENV, EF579760 (17)		VP1	2530-2650	99%	1.08E-52
SC4498	172	CpDENV, EF579766 (17)		VP1	2947-3118	97%	2.20E-76
<i>Contigs related to Dependovirus, Parvovirinae, Parvoviridae</i>							
SC9104	104	Bat AAV YNM, GU226971 (26)		Cap	2218-2322	100%	1.02E-45
SC2991	369	Bat AAV YNM, GU226971 (26)		Cap	3130-3504	83%	8.98E-105
SC3108	119	Bat AAV, GU226904 (26)		Cap	238-356	100%	3.02E-53
SC3386	213	Bat AAV YNM, GU226971 (26)		Cap	2691-2901	88%	2.67E-70
SC3684	168	Bat AAV YNM, YP_003858571 (26)		Rep	522-576	99%	1E-84
SC5244	103	Bat AAV YNM, GU226971 (26)		Rep	1363-1464	100%	4.10E-44
SC5981	132	Bat AAV YNM, GU226971 (26)		Cap	3877-3991	94%	7.17E-43
<i>Contigs related to Cripavirus, Dicistroviridae</i>							
SC12367	161	RhPV, AF022937 (9)		NS	4853-5013	89%	1.55E-52
SC13254	106	HiPV, AB183472 (21)		NS	4627-4732	87%	2.40E-28

Table S2B Contigs related to eukaryotic viruses as determined with Blastx and the GenBank database.

Contig No.	Length (nt)	Best-matched virus		Region	Coverage on Protein	Identity	E-value
		Abbreviation and GenBank No.					
<i>Contigs related to Dengovirus, Dengovirinae, Parvoviridae</i>							
SC36	468	DsDENV, NP_046813		NS1	63-201	32%	3.05E-17
SC1118	945	BgDENV, NP_874380 (20)		VP1	152-424	41%	2.47E-52

SC1605	867	MpDENV, NP_874377 (32)	VP1	163-379	27%	8.49E-09
SC1902	196	GmDENV, NP_899650 (28)	NS1	500-544	62%	1.68E-07
SC1998	313	JcDENV, NP_694824 (11)	NS1	486-543	49%	1.10E-06
SC2209	577	PcDENV, NP_694842 (3)	VP1	193-376	34%	6.54E-19
SC2695	139	GmDENV, NP_958099 (27)	NS1	403-433	77%	1.54E-05
SC2851	138	BgDENV, NP_874381 (20)	NS1	443-484	47%	1.45E-03
SC3047	204	MIDNV, NP_958102 (27)	VP1	473-535	41%	6.33E-07
SC4696	203	GmDENV, NP_899650 (28)	NS1	480-544	70%	3.24E-19
SC5360	175	BgDENV, NP_874381 (20)	NS1	510-528	68%	3.34E+00
SC5901	109	MIDNV, NP_958099 (27)	NS1	403-439	67%	3.53E-05
SC6358	117	PcDENV, NP_694843 (3)	NS1	479-517	66%	2.19E-07
<i>Contigs related to Iteravirus, Densovirinae, Parvoviridae</i>						
SC891	209	DpDENV, YP_164341 (14)	VP1	253-320	51%	5.87E-13
SC2055	138	BmDENV-5, NP_694837	VP1	327-370	50%	7.67E-05
SC2886	491	BmDENV-1, AAK55490 (29)	VP1	234-391	35%	1.36E-17
SC3749	573	CeDENV, NP_694838 (12)	NS1	345-405	39%	7.52E-04
SC3908	519	BmDENV-5, AAK55488 (29)	NS1	491-657	30%	1.05E-18
SC4064	171	CeDENV, NP_694840 (12)	VP1	398-450	60%	8.51E-12
SC4272	322	DpDENV, YP_164339 (14)	NS1	508-599	25%	3.27E-03
SC4393	192	CeDENV, NP_694838 (12)	NS1	497-551	39%	2.14E-02
SC4701	139	DpDENV, YP_164339 (14)	NS1	633-677	53%	7.39E-08
SC5262	154	DpDENV, YP_164341 (14)	VP1	267-314	56%	9.89E-08
SC2448	216	DpDENV, YP_164340 (14)	NS2	366-430	37%	8.45E-04
<i>Contigs related to Brevidensovirus, Densovirinae, Parvoviridae</i>						
SC6156	406	C6/36DENV, AAM28943 (34)	NS1	443-574	43%	1.77E-25
<i>Contigs related to Pefudensovirus, Densovirinae, Parvoviridae</i>						
SC4095	280	PfDENV, NP_051016 (13)	Gp1	165-237	29%	1.03E-01
SC9011	307	PfDENV, NP_051020 (13)	Gp5	289-385	37%	2.91E-12
<i>Contigs related to unclassified Densovirinae</i>						
SC116	1467	CpDENV, YP_002887625 (4)	NS1	249-548	43%	3.08E-59
SC444	1927	CpDENV, YP_002887627 (4)	VP1	117-567	42%	5.55E-30
SC525	865	CpDENV, YP_002887627 (4)	VP1	299-572	50%	2.12E-68
SC660	108	CpDENV, YP_002887627 (4)	VP1	333-367	85%	4.79E-10
SC1180	469	BmDENV-3, AAY41819	NS1	746-865	45%	5.00E-28
SC1370	316	BmDENV, ACD68163	NS1	631-734	47%	1.33E-20
SC1504	117	CpDENV, YP_002887627 (4)	VP1	468-506	66%	1.16E-08
SC3308	301	AdDENV, YP_227602	VP1	68-187	43%	4.41E-16
SC3412	238	CpDENV, YP_002887627 (4)	VP1	261-304	57%	1.86E-06
SC3435	147	CppDENV, ABU94990 (17)	NS1	623-670	66%	2.15E-10
SC3620	120	CpDENV, YP_002887627 (4)	VP1	468-506	48%	3.61E-02
SC3071	238	CpDENV, YP_002887627 (4)	VP1	661-729	95%	1.35E-33
SC4080	121	AdDENV, YP_227602	VP4	211-250	72%	1.16E-08
SC4092	471	CpDENV, YP_002887627 (4)	VP1	228-387	44%	1.90E-27
SC4182	115	AdDENV, YP_227602	VP4	252-288	89%	1.13E-11
SC4204	179	BmDENV, ACD68163	VP1	1003-1050	35%	1.35E-01
SC4514	131	AdDENV, YP_227602	VP1	31-77	70%	1.36E-09
SC4519	192	DplDENV, ACG50803 (25)	NS1	279-328	40%	3.53E-05
SC4534	116	CpDENV, YP_002887625 (4)	NS1	395-429	48%	5.25E-01
SC5751	108	CpDENV, YP_002887625 (4)	NS1	271-305	60%	3.55E-05
SC5806	109	BmDENV-3, AAY41819	NS1	842-865	66%	8.16E-02
SC5926	111	CppDENV, ABU94997 (17)	NS2	309-344	63%	2.99E-04

SC5974	114	CpDENV, YP_002887625 (4)	NS1	510-546	64%	6.43E-07
SC6116	141	DplDENV, ACI01073 (25)	NS1	569-612	46%	9.98E-05
<i>Contigs related to Parvovirus, Parvovirinae, Parvoviridae</i>						
SC462	133	Parvovirus YX-2010/CHN, ADF32029 (33)	NS	389-431	51%	5.52E-03
SC2596	133	Parvovirus YX-2010/CHN, ADF32029 (33)	NS	389-431	51%	5.51E-03
SC2718	118	Human parvovirus B19, BAD02255 (1)	NS1	351-387	67%	4.14E-06
SC5510	115	H-1 parvovirus, ADF32028 (33)	VP1	270-298	51%	2.61E+00
<i>Contigs related to Bocavirus, Parvovirinae, Parvoviridae</i>						
SC630	435	PBV2 pig/ZJD/China/2006, ADI60258 (6)	VP1	35-131	41%	3.79E-12
<i>Contigs related to Dependovirus, Parvovirinae, Parvoviridae</i>						
SC4399	213	AAV-3, 295321744 (5)	Cap	18-76	58%	3.54E-10
<i>Contigs related to Cripavirus Dicistroviridae</i>						
SC2803	1149	HoCV-1, YP_610950 (15)	NS	603-756	27%	2.45E-10
SC3842	239	HiPV, BAD27584 (21)	NS	1347-1417	42%	7.99E-10
SC3921	211	CrPV, 1B35_B (16)	Cap	174-231	39%	5.50E-03
SC4317	205	BQCV, ACL13310 (19)	RdRp	1-65	67%	4.36E-16
<i>Contigs related to unassigned Dicistroviridae</i>						
SC2638	229	ABPV, AAN63803 (23)	Rep	585-659	56%	9.50E-19
<i>Contigs related to Iflavirus, Iflavirusidae</i>						
SC4466	134	IFV, NP_620559 (2)	Cap	253-289	59%	1.45E-03
<i>Contigs related to Megalocytivirus, Iridoviridae</i>						
SC3395	423	Orange-spotted grouper iridovirus, AAX82347 (18)	ORF38R	141-266	26%	1.99E+00
<i>Contigs related to unclassified Picornaviridae</i>						
SC2797	573	Picorna-like virus ADR79388 (10)	polyprotein	68-247	45%	1.63E-38
SC3066	287	Picorna-like virus, ADR79388 (10)	RT_like	239-327	66%	9.56E-27
<i>Contigs related to unclassified Circoviridae</i>						
SC703	1578	Circoviridae TM-6c, ADI48253 (8)	Rep	2-197	44%	7.77E-43
SC3668	171	Virus NG11, circoviruses, ADF80744 (7)	Rep	18-74	41%	4.22E-03
<i>Contigs related to unclassified Papillomaviridae</i>						
SC2842	149	Human papillomavirus type 128, ADR77922 (22)	E1	421-446	62%	4.05E-01
<i>Contigs related to unclassified ssRNA positive-strand viruses</i>						
SC1065	163	SINV-2, YP_001285729 (31)	RdRp	1801-1847	55%	3.85E-04
SC2966	202	SINV-3, YP_002790879 (30)	NTPase	457-514	34%	1.36E-17
SC4853	412	SINV-2, YP_001285729 (31)	RdRp	1761-1872	34%	2.46E-11
SC6360	131	SINV-2, YP_001285729 (31)	NS	1743-1778	41%	1.39E-01
SC8863	342	SINV-2, YP_001285727 (31)	Gp2	44-149	37%	1.09E-14

**Abbreviations:** *Blattella germanica* densovirus, BgDENV; *Diatraea saccharalis* densovirus, DsDENV; *Junonia coenia* densovirus, JcDENV; *Galleria mellonella* densovirus, GmDENV; *Haemagogus equinus* densovirus, HeDENV; *Aedes albopictus* C6/36 cell densovirus, C6/36

DNV; *Culex pipiens densovirus*, CpDNV; *Myzus persicae densovirus*, MpDNV; *Planococcus citri densovirus*, PcDNV; *Dendrolimus punctatus densovirus*, DpDNV; *Mythimna loreyi densovirus*, MIDNV; *Periplaneta fuliginosa densovirus*, PfDNV; *Acheta domestica densovirus*, AdDNV; *Dysaphis plantaginea densovirus*, DplDNV; *Bat adeno-associated virus YNM*, Bat AAV YNM; *Adeno-associated virus 3*, AAV-3; *Porcine bocavirus 2 pig/ZJD/China/2006*, PBV2 pig/ZJD/China/2006; *Rhopalosiphum padi virus*, RhPV; *Himetobi P virus*, HiPV; *Homalodisca coagulata virus-1*, HoCV-1; *Cricket Paralysis Virus*, CrPV; *Black queen cell virus*, BQCV; *Acute bee paralysis virus*, ABPV; *Infectious flacherie virus*, IFV; *Solenopsis invicta virus 2*, SINV-2; *Casphalia Externa densovirus*, CeDNV.

Table S3 Primers used for the detection of specific viruses

Gene	Primer name	Primer sequence	Amplicon size (bp)	Target virus	Virus subfamily/family
NS1	INSF1	5'-TTACCAGGCACTTCAGG-3'	765	BgDNV	<i>Densovirinae</i> <i>/Parvoviridae</i>
	INSR1	5'-GCAGATAAAACTTGTTTACCA-3'			
NS1	INSF2	5'-GTATTACCAGATCTGATCA-3'	528	GmDNV	
	INSR2	5'-AGAAATAGATGAAGACATCA-3'			
NS1	INSF3	5'-AGGAACAATGGCCAGCC-3'	535	MIDNV	
	INSR3	5'-ATCGGAGCTTGATACCAC-3'			
NS1	INSF4	5'-CCTCTAGTGAACAATGTAG-3'	682	CeDNV	
	INSR4	5'-GTCTTCCGTTAGTACTGC-3'			
NS1	INSF5	5'-GCGCAGGAAATGCAGAA-3'	789	CpDNV	
	INSR5	5'-TGATCCTGCTCCTGGTA-3'			
NS1	INSF6	5'-TGTTTATAGAACTGAATCT-3'	733	BmDNV	
	INFR6	5'-TCTATTAACAGCTTCCAT-3'			
RdRp	INSF7	5'-ATATTGCAGGAATTACGCA-3'	630	AIPV	<i>Dicistroviridae</i>
	INSR7	5'-GCAAGTTCATCTACATCAG-3'			
RdRp	INSF8	5'-CAAGTTGCCAATGAGCAA-3'	464	HiPV	
	INSR8	5'-CTATCCACTCTTTGTCAA-3'			
RdRp	INSF9	5'-AATGCCTAATTGGTGTCG-3'	589	IAPV	
	INSR9	5'-ATGAAGTATCCTGAGCCA-3'			
RdRp	INSF10	5'-TGTCTGTACCTGGATGC-3'	418	RhPV	
	INSR10	5'-GAATGGTCCTAGAGGTC-3'			
N	BCNF	5'-GACGGTTCTGACTCCGAA-3'	348	BtCoV HKU9	<i>Coronaviridae</i>
	BCNR	5'-ACGHGTRCCCATRTACC-3'			

The abbreviations: BgDNV, *Blattella germanica densovirus*; CeDNV, *Casphalia extranea densovirus*; CpDNV, *Culex pipiens densovirus*; BmDNV, *Bombyx mori densovirus*; GmDNV, *Galleria mellonella densovirus*; AIPV, *Aphid lethal paralysis virus*, HiPV, *Himetobi P virus*; RhPV, *Rhopalosiphum padi virus*; IAPV, and *Israel acute paralysis virus of bees*; BtCoV HKU9, *bat coronavirus strain HKU9*; NS, non-structural protein; RdRp, RNA-dependent RNA polymerase; N, nucleocapsid protein.



Table S4 The nucleotide identities of the densovirus replicons amplified with specific primers.

Virus sequence	Nucleotide identity %										
	GmDENV -GD	GmDENV -HN	MIDNV -HB	MIDNV -TJ	BmDENV -GD	CeDENV -TJ	CeDENV -GD	CpDENV -TJ	CpDENV -YNM	BgDENV -TJ	BgDENV -YNM
GmDENV-TJ	78	64	72	90	39	41	41	31	32	27	32
GmDENV-GD	-	62	92	72	32	34	34	26	26	23	26
GmDENV-HN	-	-	58	60	29	31	31	23	23	22	23
MIDNV-HB	-	-	-	77	32	33	33	25	26	21	24
MIDNV-TJ	-	-	-	-	38	39	3	32	32	26	31
BmDENV-GD	-	-	-	-	-	86	86	37	37	31	33
CeDENV-TJ	-	-	-	-	-	-	99	37	37	31	34
CeDENV-GD	-	-	-	-	-	-	-	37	37	32	34
CpDENV-TJ	-	-	-	-	-	-	-	-	97	33	32
CpDENV-YNM	-	-	-	-	-	-	-	-	-	33	31
BgDENV-TJ	-	-	-	-	-	-	-	-	-	-	33

Table S5 The nucleotide identities of the dicistrovirus replicons amplified with specific primers.

Virus	Nucleotide identity %				
	RhPV-YNH	HiPV-YNM	IAPV-TJ	AIPV-TJ	AIPV-YNH
RhPV-HN	89	24	21	28	28
RhPV-YNH	-	25	20	28	28
HiPV-YNM	-	-	26	31	31
IAPV-TJ	-	-	-	33	33
AIPV-TJ	-	-	-	-	98

Table S6 The aa identities of the proteins encoded by the 5' ORFs of the BgDENV-like virus and BgDENV

Virus	ORFs and length of proteins (aa)				
	ORF1	ORF2	ORF3	ORF4	ORF5
BgDENV-like virus	593	303	533	265	170
BgDENV	628	229	530	262	216
aa identities (%)	37	49	59	58	31

### References

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